

In the Claims:

1. (canceled)
2. (currently amended) A method according to Claim 5 further comprising the step of: developing the layer so that portions thereof are maintained and maintained or removed according to the intensity of the holographic projection of the desired image thereon.
3. (currently amended) A method for patterning a layer on a substrate with a desired image, the method comprising the steps of:

projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface ~~to provide a holographic projection of the desired image~~ wherein the reflector surface includes information that corresponds to ~~an inverse of the~~ ~~holographic projection of the desired image;~~

projecting a portion of the coherent radiation to the layer without reflecting off the reflector surface; and

maintaining the substrate including the layer in the path of the ~~of the~~ reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the reflected radiation and the coherent radiation projected without reflecting off the reflector surface interfere to provide a holographic projection of the desired image and so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the layer comprises an oxide layer that is activated on exposure to portions of the holographic projection of the desired image having sufficient intensity, so that activated portions of the oxide layer can be selectively removed, maintained, or modified.
- 4.(currently amended) A method for patterning a layer on a substrate with a desired image, the method comprising the steps of:

projecting coherent radiation toward a reflector surface so that the coherent radiation

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is reflected off the reflector surface ~~to provide a holographic projection of the desired image~~ wherein the reflector surface includes information that corresponds to ~~an inverse of the~~ ~~holographic projection of the desired image;~~

projecting a portion of the coherent radiation to the layer without reflecting off the reflector surface; and

maintaining the substrate including the layer in the path of the ~~of the~~ reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the reflected radiation and the coherent radiation projected without reflecting off the reflector surface interfere to provide a holographic projection of the desired image and so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the layer comprises a silicon layer that is activated on exposure to portions of the holographic projection of the desired image having sufficient intensity, so that activated portions of the silicon layer can be selectively oxidized or modified.

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5. (currently amended) A method for patterning a layer on a substrate with a desired image, the method comprising the steps of:

projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface ~~to provide a holographic projection of the desired image~~ wherein the reflector surface includes information that corresponds to ~~an inverse of the~~ ~~holographic projection of the desired image;~~

projecting a portion of the coherent radiation to the layer without reflecting off the reflector surface; and

maintaining the substrate including the layer in the path of the ~~of the~~ reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the reflected radiation and the coherent radiation projected without reflecting off the reflector surface interfere to provide a holographic projection of the desired image and so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the step of projecting coherent radiation comprises projecting a coherent beam of electrons.

6. (original) A method according to Claim 5 wherein the step of projecting coherent radiation further comprises generating the coherent beam of electrons from a nanotip field emitter.

7. (original) A method according to Claim 6 wherein the nanotip field emitter comprises a tip having dimensions on the order of an atom.

8. (previously presented) A method according to Claim 11 wherein the step of projecting coherent radiation comprises projecting laser radiation.

9. (previously presented) A method according to Claim 5 wherein the holographic projection of the desired image comprises a Fresnel hologram.

10. (currently amended) A method for patterning a layer on a substrate with a desired image, the method comprising the steps of:

projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface ~~to provide a holographic projection of the desired image~~ wherein the reflector surface includes information that corresponds to ~~an inverse of the~~ ~~holographic projection of~~ the desired image;

projecting a portion of the coherent radiation to the layer without reflecting off the reflector surface; and

maintaining the substrate including the layer in the path of the ~~of the~~ reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the reflected radiation and the coherent radiation projected without reflecting off the reflector surface interfere to provide a holographic projection of the desired image and so that the holographic projection of the desired image is projected onto

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the layer to thereby pattern the layer with the desired image;

wherein the step of projecting the coherent radiation comprises projecting the coherent radiation along divergent paths.

11. (currently amended) A method for patterning a layer on a substrate with a desired image, the method comprising the steps of:

projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface ~~to provide a holographic projection of the desired image~~ wherein the reflector surface includes information that corresponds to ~~an inverse of the holographic projection of~~ the desired image;

projecting a portion of the coherent radiation to the layer without reflecting off the reflector surface;

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maintaining the substrate including the layer in the path of the ~~of the~~ reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the reflected radiation and the coherent radiation projected without reflecting off the reflector surface interfere to provide a holographic projection of the desired image and so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image; and

filtering the coherent radiation reflected off the reflector surface to reduce transmission of portions of the interference pattern corresponding to defects on the reflector surface.

12. (previously presented) A method according to Claim 5 wherein projecting coherent radiation comprises projecting two beams of coherent radiation toward the reflector surface.

13. (currently amended) A method for patterning a layer on a substrate with a desired image, the method comprising the steps of:

projecting first coherent radiation toward a first reflector surface so that the first

coherent radiation is reflected off the first reflector surface ~~to provide a holographic projection of the desired image~~ wherein the first reflector surface includes first information that corresponds to ~~an inverse of the holographic projection of the desired image;~~

projecting second coherent radiation toward a second reflector surface so that the second coherent radiation is reflected off the second reflector surface wherein the second reflector surface includes second information that corresponds to the desired image;

projecting a portion of the third coherent radiation to the layer without reflecting off the first reflector surface and without reflecting off the second reflector surface; and

maintaining the substrate including the layer in the path of the reflected radiation from the first and second reflector surfaces and in the path of the portion of the third coherent radiation projected without reflecting off the first reflector surface and without reflecting off the second reflector surface so that the reflected radiation from the first and second reflector surfaces and the third coherent radiation projected without reflecting off the reflector surfaces interfere to provide a holographic projection of the desired image and so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image; and

projecting coherent radiation toward a second reflector surface so that the coherent radiation is reflected off the second reflector surface to provide a second holographic projection of reflected radiation;

wherein maintaining the substrate further comprises maintaining the substrate including the layer in the path of the radiation reflected off the second reflector surface so that the second holographic projection is projected onto the layer.

14. (canceled)

15. (canceled)

16. (currently amended) A system for patterning a layer on a substrate with a desired image, the system comprising:

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means for projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface ~~to provide a holographic projection of the desired image~~ wherein the reflector surface includes information that corresponds to ~~an inverse of the holographic projection of~~ the desired image;

means for projecting a portion of the coherent radiation to the substrate including the layer without reflecting off the reflector surface; and

means for maintaining the substrate including the layer in the path ~~of the~~ of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the reflected radiation and the coherent radiation projected without reflecting off the reflector surface interfere to provide a holographic projection of the desired image and so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the layer comprises an oxide layer that is activated on exposure to portions of the holographic projection of the desired image having sufficient intensity, so that activated portions of the oxide layer can be selectively removed, maintained, or modified.

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17. (currently amended) A system for patterning a layer on a substrate with a desired image, the system comprising:

means for projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface ~~to provide a holographic projection of the desired image~~ wherein the reflector surface includes information that corresponds to ~~an inverse of the holographic projection of~~ the desired image;

means for projecting a portion of the coherent radiation to the substrate including the layer without reflecting off the reflector surface; and

means for maintaining the substrate including the layer in the path ~~of the~~ of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the reflected radiation and the coherent radiation projected without reflecting off the reflector surface interfere to provide a holographic projection of the desired image and so that the holographic projection of the desired image is

projected onto the layer to thereby pattern the layer with the desired image;

wherein the layer comprises a silicon layer that is activated on exposure to portions of the holographic projection of the desired image having sufficient intensity, so that activated portions of the silicon layer can be selectively oxidized or modified.

18. (currently amended) A system for patterning a layer on a substrate with a desired image, the system comprising:

means for projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface ~~to provide a holographic projection of the desired image~~ wherein the reflector surface includes information that corresponds to ~~an inverse of the holographic projection of~~ the desired image;

means for projecting a portion of the coherent radiation to the substrate including the layer without reflecting off the reflector surface; and

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means for maintaining the substrate including the layer in the path ~~of the~~ of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the reflected radiation and the coherent radiation projected without reflecting off the reflector surface interfere to provide a holographic projection of the desired image and so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the means for projecting coherent radiation comprises means for projecting a coherent beam of electrons.

19. (original) A system according to Claim 18 wherein the means for projecting coherent radiation further comprises means for generating the coherent beam of electrons from a nanotip field emitter.

20. (original) A system according to Claim 19 wherein the nanotip field emitter comprises a tip having dimensions on the order of an atom.

21. (currently amended) A system according to Claim 24 wherein the means for projecting coherent radiation comprises means for projecting laser radiation radiation.

22. (previously presented) A system according to Claim 18 wherein the holographic projection of the desired image comprises a Fresnel hologram.

23. (currently amended) A system for patterning a layer on a substrate with a desired image, the system comprising:

means for projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface ~~to provide a holographic projection of the desired image~~ wherein the reflector surface includes information that corresponds to ~~an inverse of the holographic projection of~~ the desired image;

means for projecting a portion of the coherent radiation to the substrate including the layer without reflecting off the reflector surface; and

means for maintaining the substrate including the layer in the path ~~of the~~ of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the reflected radiation and the coherent radiation projected without reflecting off the reflector surface interfere to provide a holographic projection of the desired image and so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image;

wherein the means for projecting the coherent radiation comprises means for projecting the coherent radiation along divergent paths.

24. (currently amended) A system for patterning a layer on a substrate with a desired image, the system comprising:

means for projecting coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface ~~to provide a holographic projection of the desired image~~ wherein the reflector surface includes information that corresponds to ~~an inverse of the holographic projection of~~ the desired image;

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means for projecting a portion of the coherent radiation to the substrate including the layer without reflecting off the reflector surface;

means for maintaining the substrate including the layer in the path of the reflected radiation and in the path of the portion of the coherent radiation projected without reflecting off the reflector surface so that the reflected radiation and the coherent radiation projected without reflecting off the reflector surface interfere to provide a holographic projection of the desired image and so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image; and

means for filtering the coherent radiation reflected off the reflector surface to reduce transmission of portions of the interference pattern corresponding to defects on the reflector surface.

25. (previously presented) A system according to Claim 18 wherein the means for projecting coherent radiation comprises means for projecting two beams of coherent radiation toward the reflector surface.

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26. (currently amended) A system for patterning a layer on a substrate with a desired image, the system comprising:

means for projecting first coherent radiation toward a first reflector surface so that the first coherent radiation is reflected off the first reflector surface to provide a holographic projection of the desired image wherein the first reflector surface includes first information that corresponds to an inverse of the holographic projection of the desired image;

means for projecting second coherent radiation toward a second reflector surface so that the second coherent radiation is reflected off the second reflector surface wherein the second reflector surface includes second information that corresponds to the desired image;

means for projecting a portion of the third coherent radiation to the substrate including the layer without reflecting off the first reflector surface and without reflecting off the second reflector surface; and

means for maintaining the substrate including the layer in the path of the of the

reflected radiation from the first and second reflector surfaces and in the path of the portion of the third coherent radiation projected without reflecting off the first reflector surface and without reflecting off the second reflector surface so that the reflected radiation from the first and second reflector surfaces and the coherent radiation projected without reflecting off the first and second reflector surfaces interfere to provide a holographic projection of the desired image and so that the holographic projection of the desired image is projected onto the layer to thereby pattern the layer with the desired image. image;

~~means for projecting coherent radiation toward a second reflector surface so that the coherent radiation is reflected off the second reflector surface to provide a second holographic projection of reflected radiation; and~~

~~means for maintaining the substrate including the layer in the path of the radiation reflected off the second reflector surface so that the second holographic projection is projected onto the layer.~~

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27. (canceled)

28. (canceled)

29. (currently amended) A system for patterning a layer on a substrate surface with a desired image, the system comprising:

a radiation source that is configured to project coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface and so that a portion of the coherent radiation is projected to the layer without reflecting off the reflector surface so that the coherent radiation reflected off the reflector surface and the coherent radiation projected without reflecting off the reflector surface interfere to project a holographic projection of the desired image on the layer so that the holographic projection image of the desired image is used to pattern the layer with the desired image;

wherein the layer comprises an oxide layer that is activated on exposure to portions of the holographic projection of the desired image having sufficient intensity, so that activated

portions of the oxide layer can be removed, maintained, or modified.

30. (currently amended) A system for patterning a layer on a substrate surface with a desired image, the system comprising:

a radiation source that is configured to project coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface and so that a portion of the coherent radiation is projected to the layer without reflecting off the reflector surface so that the coherent radiation reflected of the reflector surface and the coherent radiation projected without reflecting off the reflector surface interfere to project a holographic projection of the desired image on the layer so that the holographic projection image of the desired image is used to pattern the layer with the desired image;

wherein the layer comprises a silicon layer that is activated on exposure to portions of the holographic projection of the desired image having sufficient intensity, so that activated portions of the silicon layer can be selectively oxidized or modified.

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31. (currently amended) A system for patterning a layer on a substrate surface with a desired image, the system comprising:

a radiation source that is configured to project coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface and so that a portion of the coherent radiation is projected to the layer without reflecting off the reflector surface so that the coherent radiation reflected of the reflector surface and the coherent radiation projected without reflecting off the reflector surface interfere to project a holographic projection of the desired image on the layer so that the holographic projection image of the desired image is used to pattern the layer with the desired image;

wherein the coherent radiation comprises a coherent beam of electrons.

32. (original) A system according to Claim 31 wherein the radiation source comprises a nanotip field emitter.

33. (original) A system according to Claim 32 wherein the nanotip field emitter comprises a tip having dimensions on the order of an atom.

34. (previously presented) A system according to Claim 37 wherein the coherent radiation comprises laser radiation.

35. (previously presented) A system according to Claim 31 wherein the holographic projection of the desired image comprises a Fresnel hologram.

36. (currently amended) A system for patterning a layer on a substrate surface with a desired image, the system comprising:

a radiation source that is configured to project coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface and so that a portion of the coherent radiation is projected to the layer without reflecting off the reflector surface so that the coherent radiation reflected off the reflector surface and the coherent radiation projected without reflecting off the reflector surface interfere to project a holographic projection of the desired image on the layer so that the holographic projection image of the desired image is used to pattern the layer with the desired image;

wherein the radiation source projects the coherent radiation along divergent paths.

37. (currently amended) A system for patterning a layer on a substrate surface with a desired image, the system comprising:

a radiation source that is configured to project coherent radiation toward a reflector surface so that the coherent radiation is reflected off the reflector surface and so that a portion of the coherent radiation is projected to the layer without reflecting off the reflector surface so that the coherent radiation reflected off the reflector surface and the coherent radiation projected without reflecting off the reflector surface interfere to project a holographic projection of the desired image on the layer so that the holographic projection image of the desired image is used to pattern the layer with the desired image; and

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a filter that is configured to filter the coherent radiation reflected off the reflector surface to reduce transmission of portions of the interference pattern corresponding to defects on the reflector surface.

38. (previously presented) A system according to Claim 31 wherein the radiation source comprises two radiation sources that are each configured to project a respective beam of coherent radiation toward the reflector surface.

39. (currently amended) A system for patterning a layer on a substrate surface with a desired image, the system comprising:

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a radiation source that is configured to project first coherent radiation toward a first reflector surface so that the first coherent radiation is reflected off the first reflector surface, that is configured to project second coherent radiation toward a second reflector surface so that the second coherent radiation is reflected off the second reflector surface, and that is configured to project third coherent radiation without reflecting off the first reflector surface and without reflecting off the second reflector surface and so that a portion of the coherent radiation is projected to the layer without reflecting off the reflector surface so that the coherent radiation reflected off the first and second reflector surfaces and the coherent radiation projected without reflecting off the first reflector surface and without reflecting off the second reflector surface interfere to project a holographic projection of the desired image on the layer so that the holographic projection image of the desired image is used to pattern the layer with the desired image.

wherein the radiation source is further configured to project coherent radiation toward a second reflector surface so that the coherent radiation is reflected off the second reflector surface to project a second holographic projection of reflected radiation on the layer.

40. (canceled)